(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 380 442 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.01.2004 Bulletin 2004/03

(51) Int Cl.[7]: **B42D 15/00**, B42D 15/10 .

(21) Application number: **03101970.6**

(22) Date of filing: **02.07.2003**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

(30) Priority: **08.07.2002 FI 20021345**

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(54) Method of producing an information page, and an information page

(57) The present invention relates to a method of producing a layered and flexible information page (10) of a secure document by laminating layers of the information page together. To make the information page in an easy and simple manner, the method comprises: forming a separation layer (9a) of a material that prevents layers (3, 4) from laminating together, placing layers (1 to 6) of the layered information page on top of each other in such a manner that the separation layer (9a) partially separates two layers (3, 4) from each other, laminating the layers (1 to 6) together, and forming a connection piece (14) by removing a part (12) from the laminated information page (10) by making a cut (11a) extending to the separation layer and by removing the part (12) separated by the cut.

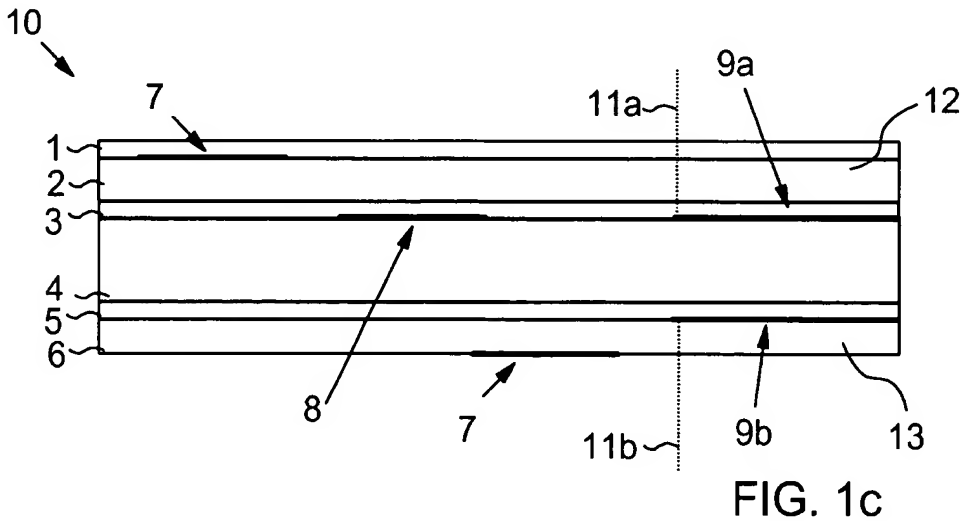

FIG. 1c

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Description

FIELD OF THE INVENTION

[0001] This invention relates to producing a layered and flexible information page of a secure document, such as a passport. In the following, the invention is primarily described with reference to a passport, even though the invention can also be utilized in other secure documents that require a flexible information page.

BACGROUND OF THE INVENTION

[0002] Known layered information pages comprise a connection piece, through which the information page is attached to the secure document by using stitching, for example. Due to the flexibility requirements of information pages of secure documents, such as the information pages of passports, the connection piece should be made as flexible as possible. In addition, it is important that the breaking resistance of the information page is sufficient so that the information page does not tear and detach from the secure document.

[0003] A layered information page is previously known, in which only part of the layers forms the connection piece. The other layers are, before the layers are laminated together, cut smaller than the layers forming the connection piece. This known information page is made in several steps with several lamination steps. A few layers are then placed on top of each other and laminated together at one time. After this, more layers are added and lamination is repeated until all layers of the information page are laminated together.

[0004] In the above-mentioned known information page, at least part of the information on the information page is recorded on a laser-engraving layer by using laser engraving. The energy from the laser beam then causes the plastic material of the laser-engraving layer to darken at the points where the energy is directed. This way, the desired information can be written and drawn on the laser-engraving layer. The laser-engraving layer can be made of polycarbonate (PC), for example. Practice has shown that altering the information engraved on such a laser-engraving layer later on for forging purposes is very difficult. In known solutions, other layers are usually attached to the laser-engraving layer of the information page. These include a printing layer, on the surface of which part of the information of the information page is printed.

[0005] One problem associated with the above-mentioned known solution is that the materials that are suitable for use on the laser-engraving layer do not usually have a good bending strength. Material with a good bending strength is a material that endures repeated bending. In addition, cutting individual layers one at a time into the correct size, and placing these cut layers exactly in the correct position relative to each other before lamination is a slow and difficult way of producing an information page.

BRIEF DESCRIPTION OF THE INVENTION

[0006] It is an object of the present invention to solve the problem described above and to provide a manufacturing method that facilitates the production of an information page. This object is achieved by the method according to independent claim 1.

[0007] In the method of the invention, the connection piece of the information page is made in such a manner that the layers unnecessary for the connection piece are cut off only after the lamination step. This is possible by using a separation layer that is arranged between the layers of the layered information page before the lamination. The separation layer then prevents the parts of the layers on the opposite sides of it from joining together during the lamination. After the lamination, the desired part of predetermined layers can be cut off with a cut that extends to the separation layer in such a manner that only the layers intended for the connection piece remain in it.

[0008] The method of the invention provides the advantage that the layers placed on top of each other for lamination can be of equal size, whereby their handling and placement exactly in the correct position relative to each other is easy.

[0009] A further object of the present invention is to provide an information page that is easy to make, fulfils the bending requirements set on an information page, and is more durable than the earlier ones. This object is achieved by the information page according to independent claim 6.

[0010] In the information page of the invention, a bendable background layer made of filled and foamed polyethylene is attached to the laser-engraving layer. A polycarbonate layer that improves tearing resistance is then attached to the background layer. Practical tests have shown that a background layer of this type attached to the laser-engraving layer improves the bending properties of the information page to a sufficient extent to enable the use of the prior art materials in the laser-engraving layer. A background layer made of filled and foamed polyethylene and a polycarbonate layer improving tearing resistance attached to it comprise sufficient strength so as to together form the connection piece of the information page.

[0011] Preferred embodiments of the method and information page of the invention are set forth in the attached dependent claims 2 to 5 and 7.

BRIEF DESCRIPTION OF THE FIGURES

[0012] In the following, the invention will be described in greater detail by way of example and with reference to the attached figures, in which

Figures 1a to 1c illustrate a first preferred embodi-

ment of the method of the invention,
Figure 1d shows a first preferred embodiment of the information page of the invention, and
Figure 1e shows a secure document having an information page of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] Figures 1a to 1c illustrate a first preferred embodiment of the method of the invention.

[0014] Figure 1a shows layers 1 to 6 included in the final information page shown separate and from the end. Layer 1 is, in the example of Figure 1, made of a clear polycarbonate (PC) layer, on the bottom surface of which, in the case of Figure 1, part of the information 7 (or patterns) of the final information page is printed. The thickness of layer 1 can be 0.050 mm, for instance.

[0015] Layer 2 is also made of a clear polycarbonate (PC) layer, the thickness of which can be 0.125 mm, for instance.

[0016] The laser-engraving layer 3 is made of a plastic material, to which the information of the information page can be engraved using a laser engraving technique. The energy directed to the laser-engraving layer 3 by a laser beam then makes the laser-engraving layer darken at the desired points. This way, the required information can be recorded and drawn by moving the laser beam. A suitable material for the laser-engraving layer is clear, carbonised polycarbonate (PC), for example. The thickness of the laser-engraving layer can be 0.050 mm, for instance.

[0017] The background layer 4 is made of filled and foamed polyethylene. This material is commercially available under the name of Teslin. In the finished information page, the background layer improves the bending strength of the information page. The thickness of the background layer 4 can be 0.250 mm, for example. In the case of Figure 1a, a security print 8 is printed on the surface of the background layer 4 and forms part of the information (or patterns) to be recorded on the information page.

[0018] The separation layer 9a is also printed on the surface of the background layer. The separation layer 9a that only covers part of the background layer 4 prevents during the later lamination step the joining of the layers 3 and 4 on the opposite sides of it from attaching to each other. The material of the separation layer is selected for not allowing said attachment during lamination. A suitable material is a UV-drying (ultraviolet) printing ink, for instance.

[0019] To improve tearing resistance, a polycarbonate layer 5, which improves tearing resistance, is arranged below the background layer. The layer can be made of 0.050-mm thick clear polycarbonate, for example. A second separation layer 9b is printed on the bottom surface of the polycarbonate layer 5 to cover part of the bottom surface of the polycarbonate layer. The material of the second separation layer corresponds to that of the separation layer 9a.

[0020] In Figure 1a, the lowest layer of the information page is a white polycarbonate (PC) layer 6 with a thickness of 0.100 mm, for instance. Part of the information 7 (or patterns) of the information page is printed on the surface of the polycarbonate layer 6.

[0021] Because layers 1 to 6 of Figure 1a are equal in size, it is easy to place them on top of each other in the exactly predetermined position relative to each other. After this, the layers are laminated together in raised temperature. According to the invention, it is even possible to laminate all the layers at one time. It is then significantly easier and simpler to make the information page than in the prior art solutions.

[0022] Figure 1b shows a situation, in which layers 1 to 6 of the information page 10 are tightly joined together as a result of lamination. Only layers 3 and 4, and 5 and 6, respectively, on the opposite sides of the separation layers 9a and 9b are not joined together at the separation layers.

[0023] In the situation shown in Figure 1c, the connection piece 14, or lapel, of the information page 10, through which the information page 10 can be attached to the secure document, is produced. To produce the connection piece, a cut 11a is made from the first surface, i.e. top surface, of the information page 10 until the separation layer 9a. Correspondingly, a second cut 11b is made from the second surface, i.e. the lowermost surface in Figure 1c, of the information page until the second separation layer 9b. Because the separation layer 9a has prevented layers 3 and 4 from joining together, a part 12 can be removed from the information page after making the cut 11a. Correspondingly, after making the second cut 11b, a second part 13 can be removed from the information page.

[0024] Figure 1d shows a first preferred embodiment of the information page of the invention. The parts 12 and 13 shown in Figure 1c are removed from the information page 10 shown in Figure 1d. The final result is the information page 10, in which the thickness of the connection piece 14 is smaller than the thickness of the information page elsewhere. The connection piece 14 is made up of the background layer 4 having a good bending strength and the polycarbonate layer 5 improving tearing resistance. By means of the relatively thin, flexible and strong connection piece 14, the information page can be attached to a secure document by stitching 16, for instance. Before the information page is attached to the secure document, the information of the information page is, however, engraved on the laser-engraving layer 3 by using a laser-engraving technique, whereby dark areas 15 (letters and/or patterns) are formed at desired points of the laser-engraving layer 3.

[0025] Figure 1e shows a secure document 17 that has an information page 10 of the invention. The information page 10 is attached through its connection piece 14 to the secure document 17 by stitching 16, for exam-

ple. The example of Figure 1e assumes that the secure document is a passport.

[0026] It is to be understood that the above description and the related figures are only intended to illustrate the present invention. Thus, there may be other layers in the information page than described above, or alternatively, one of the described layers may be left out. Instead of the UV-drying printing ink, the material of the separation layer can be another material, and instead of printing, the separation layer can also be arranged between the layers in some other manner, for instance by spraying. It will thus be obvious to a person skilled in the art that the invention can be modified in many ways without departing from the scope of protection of the invention disclosed in the attached claims.

Claims

1. A method of producing a layered and flexible information page (10) of a secure document by laminating layers of the information page together, **characterized by** the method comprising:

   forming a separation layer (9a) of a material that prevents layers (3, 4) on the opposite sides of it from laminating together,
   placing layers (1 to 6) of the layered information page on top of each other in such a manner that the separation layer (9a) partially separates two layers (3, 4) from each other,
   laminating the layers (1 to 6) placed on top of each other together, and
   forming a connection piece (14) by removing a part (12) of predetermined layers from the laminated information page (10) by making a cut (11a) from a first surface of the information page until the separation layer and by removing the part (12) separated by the cut.

2. A method as claimed in claim 1, **characterized by**

   forming in addition to said separation layer a second separation layer (9b), which, when the layers of the information page are placed on top of each other, partially separates two layers (5, 6) from each other, and

   removing after the lamination from the laminated information page a part (13) of predetermined layers by making a second cut (11 b) from a second surface of the information page until the second separation layer (9b) and by removing the part (13) separated by the second cut.

3. A method as claimed in claim 2, **characterized by** joining the information page to the secure document (17) with a connection piece (14) that is formed of the parts of the layers (4, 5) that prior to removing said parts (12, 13) were between the parts (12, 13) to be removed.

4. A method as claimed in any one of claims 1 to 3, **characterized in that** the forming of the separation layer (9a, 9b) comprises printing the material serving as the separation layer on a surface of an individual layer (3, 5) of the layered information page.

5. A method as claimed in any one of claims 1 to 4, **characterized in that** all the layers (1 to 6) of the information page are joined together during the lamination step.

6. A layered and flexible information page (10) of a secure document (17) having a connection piece (14), through which the information page is attached to the secure document, the information page comprising at least:

   a laser-engraving layer (3) made of a plastic material, on which at least part of the information of the information page can be printed by using a laser-engraving technique, **characterized in that**
   a background layer (4) that has a good bending strength and is made of filled and foamed polyethylene is attached to the laser-engraving layer (3),
   a polycarbonate layer (5) improving tearing resistance is attached to the background layer (4) on the side opposite to the laser-engraving layer (3), and
   a part of said background layer (4) and a part of the polycarbonate layer (5) form the connection piece (14) of the information page.

7. An information page as claimed in claim 6, **characterized in that** said laser-engraving layer (3) is made of polycarbonate.

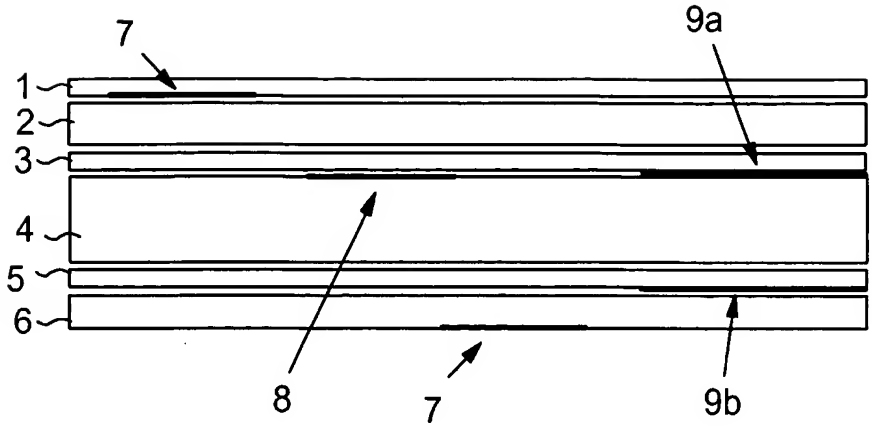

FIG. 1a

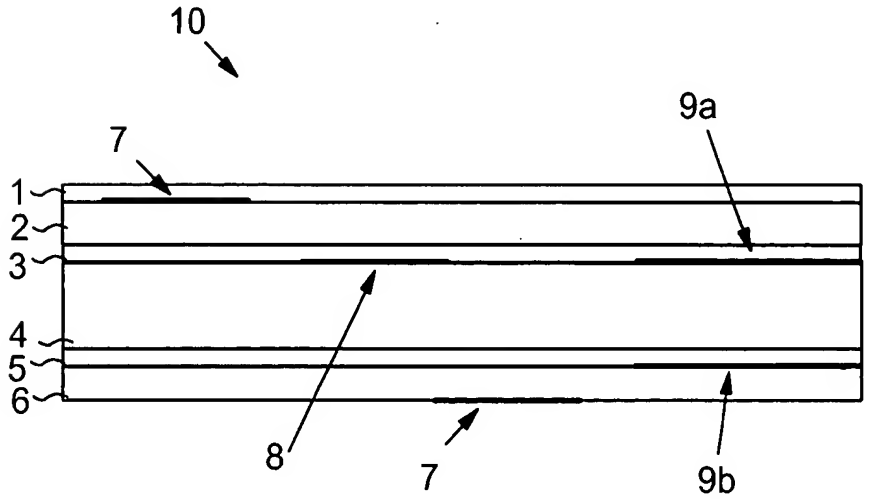

FIG. 1b

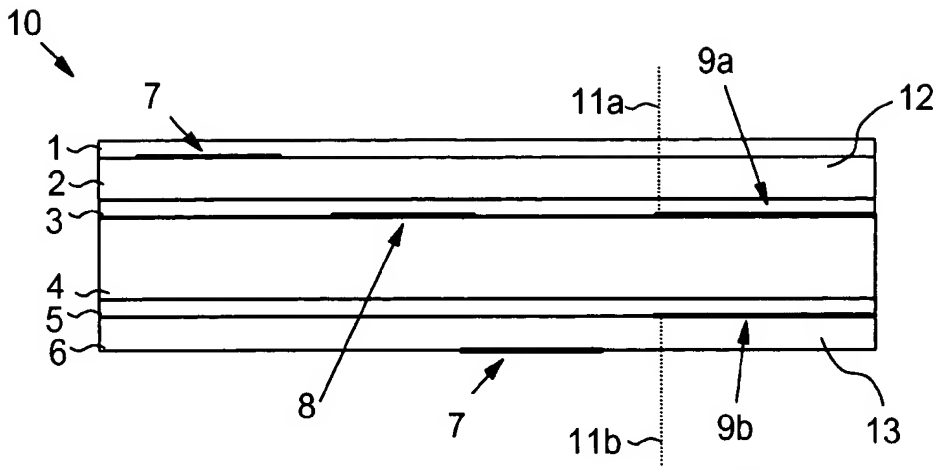

FIG. 1c

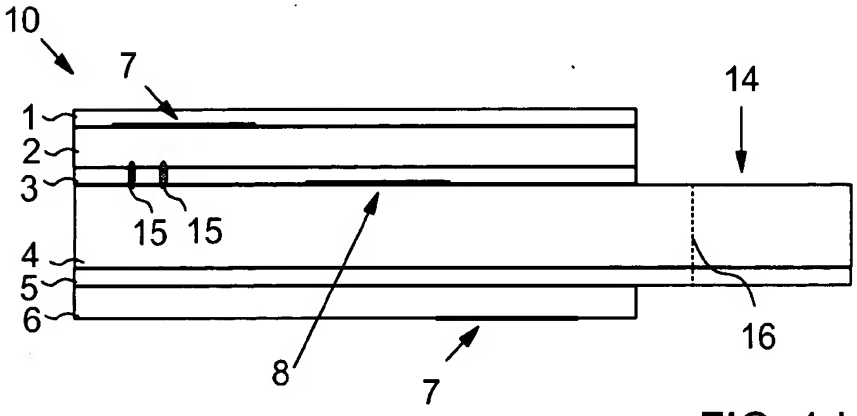

FIG. 1d

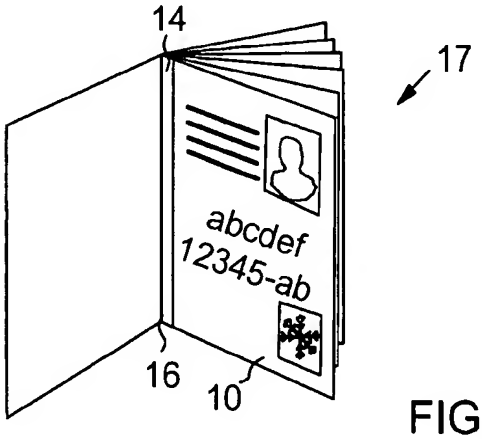

FIG. 1e

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 10 1970

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 6 135 503 A (LASS JOSEPH ET AL) 24 October 2000 (2000-10-24) * column 2, line 21 - line 31 * * column 4, line 35 - column 5, line 17; claims 10,11; figures 1-3 *	1-7	B42D15/00 B42D15/10
A	EP 1 008 459 A (ENSCHEDE SDU B V) 14 June 2000 (2000-06-14) * paragraph [0012]; figures 1-4 *	1-7	
A	WO 98 19870 A (SETEC OY) 14 May 1998 (1998-05-14) * the whole document *	1-7	
P,A	EP 1 245 407 A (SETEC OY) 2 October 2002 (2002-10-02) * paragraph [0012] - paragraph [0014]; figures 1,2 *	6,7	
A	WO 93 12940 A (AGFA GEVAERT NV) 8 July 1993 (1993-07-08) * claim 1 *	6	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B42D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	12 November 2003	D'Incecco, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

Application Number
EP 03 10 1970

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☒ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 03 10 1970

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-5

   Forming the connection piece of the information page by partially cutting away adjacent layers

2. Claims: 6,7

   Material of the layers of the information page

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 03 10 1970

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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12-11-2003

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